
**Cybercartographic Issues In Mapping
Sustainable Development Indicators:**

**An Integral Perspective on Sustainability,
Development and Well Being**

**Phd Thesis Proposal
GEOG 6909**

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Introduction

Issues surrounding sustainability, development and well being (SDW) can be examined from the perspective of human-environment relationships. Intrinsic in this approach is the necessity to situate human understanding of SDW in terms of space, time, and human-environment circumstance; which from the perspective of geography, as an amalgam of 'place'. One methodological framework designed around this approach is the Wellbeing Assessment (WA) methodology used in the Wellbeing of Nations (WoN) (Prescott-Allen, 2001).

The research plan outlined in this proposal aims to build upon the WA method as an approach to mapping indicators of SDW. In essence, the use of the geographical map as an information and indicator 'medium' for SDW will be examined. Specifically, it is anticipated that although in concept, the idea of using the map as an indicator medium may have significant advantages, implementation of this approach will often face a number of issues of central concern to cybercartography and geographical information systems science (GIS Science).

There are also questions surrounding how to best situate such an examination within a context that is not only self-critical, but also potentially reconciling and helpful for approaching issues in a practical and meaningful way. The WA methodology is presented as one way of incorporating a human-environment relations approach to SDW, and provides a very suitable framework for interfacing with an 'integral' perspective.

The contents of this proposal are presented in a number of sections. First, some of the basic issues surrounding how we approach, define, or understand SDW is presented. Second, the WA methodology is described to outline the types of research questions that will be examined. Third, a research framework, thesis outline, workplan and expected results are presented.

Sustainability, Development and Well Being

The concept of sustainable development is often presented as an approach for 'inter-linking' social, economic and environmental concerns. Graphical illustrations such as Figure 1 are commonly used to illustrate this perspective. One of the positive affects this has had over the past two decades is it enticed governments, industry, and other organizations to consider the inter-linkages among these three 'pillars' of SD. The general 'message' in these illustrations is that the economy, society, and environment are all equally important to any SD paradigm, and that too much emphasis in any one area, would necessarily result in compromises to the other areas.

The emphasis implies notions of 'balance', 'equity', and 'inter-linkage' among these domains. From this general starting point emerged much debate, both from a theoretical or discourse perspective (many of which contest the whole notion of SD as an oxymoron), and from an institutional perspective, critiquing the lack of progress in governments and industry in meeting respective SD goals and objectives.

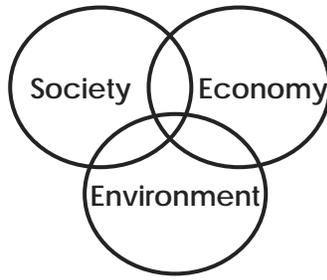


Figure 1. Graphical illustration of the ‘three pillars’ of sustainable development as interlinkages between society, economy and environment.

These types of frameworks (or those similar to this mainstream approach) have opted to add other elements such as ‘culture’, ‘heritage’, or ‘institutional’ dimensions. How they are used depends very much on how these terms are defined individually (e.g. what is ‘society?’), and collectively in compound contexts (e.g. socio-economic).

Clearly, notions of society, economy, culture, institutions and governance are all very important components that need to be considered. It is this panoptic range of subject areas that appears to be what makes SDW such a contentious and debatable concept, leading to a plethora of information ‘about’ SDW, but little agreement about how to actualize the concept. A Carleton University library search on the terms ‘Sustainable Development’, ‘sustainability’, ‘development’, ‘well being’, and ‘human-environment’ results in over 4000 references, most of which published within the last decade. Web searches for these same terms resulted in over 200,000,000 hits. A comprehensive examination of the information available is now well beyond the capacity of any single researcher, institution or government.

An important question that may be asked, however, is what kind of assumptions or thinking characterizes how SDW is contextualized in definition, debate and discourse. A presupposition of this approach might question the ‘sub-conscious’ affect that diagrams like Figure 1 have on our human understanding of SDW. If viewed as a Venn relations diagram, such constructs imply that only some ‘portions’ of economy, society, and environment are inter-linked, and that there are significant aspects of each domain that are not dependent on the other domains. Similarly, defining ‘society’ or ‘economy’ or other components, if considered to be at least a partially exclusive relation, opens the content-context relation to significant and well-founded critique.

A human-environment relational perspective may subvert these potential definitive contextual problems by ensuring that all domains (or elements of SDW, however defined), are considered as in a ‘nested’ holistic relational context. In doing so, the context in which SDW is understood or approach may be shifted onto more resilient grounds. Additionally, whereas in the former construct elements of SDW do not necessarily need to be made explicit in space-time relations, the later implies that the space-time-circumstance, or ‘place’, is foundational to any given human-environment context, thereby strengthening the importance of geography to SDW.

Human-environment relationships may be contextualized in a number of ways, two of which are presented here for context. Figure 2a presents what might be considered an ‘anthropocentric’ (or ego-centric) perspective where we humans see ourselves as central to the environment, and the environment is that which surrounds us. Figure 2b presents what is sometimes considered ‘ecological centric’ (or ‘eco-centric) perspective that sees the environment or ecology as ‘internal’ to being human, and that humans emerged from the environment and are therefore dependent upon it. In both cases, the Venn relation indicates a ‘whole-part’ relationship of some kind.

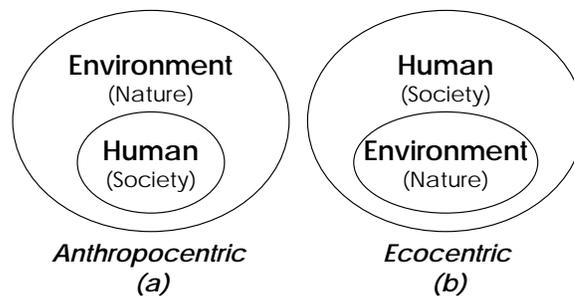


Figure 2. Two ways of looking at human-environment relationships: (a) anthropocentric, (b) ecocentric.

Integral Theory (Wilber, 1995, 2000) treats whole-part relationships as ‘holons’ (meaning explicitly, a ‘whole-part’; that things are not just parts, nor just wholes, but everything is a ‘whole-part’ of some kind). Wilber has formulated 20 ‘holonic tenets’ (Attachment A), based in part on the original work of Arthur Koestler (1967). The holonic tenets form much of Wilber’s philosophy on human consciousness, spirituality, and ecology, and are further used as a basis for critical examination of contemporary issues, including the global ecological crisis (Wilber, 2000). An integral perspective on SDW will first need to examine how both of these base perspectives are important, but need to be constructively transcended to ensure that neither one dominates the other.

It seems relevant that the holonic tenets can be applied in a number of ways to look at an integral approach to SDW, and the potential to examine the possibilities for using the geographical map as an indicator medium for SDW. It is often said that one thing is an ‘integral part’ of something else – emphasizing the importance of the part to the whole. What is often not made explicit is ‘how’ some part is integral to some other whole (in a functional and existential sense). We know that a town or city is a part of a region, which is a part of a nation, which is a part of the world as a whole. These nested relations suggest that indicators for SDW also be examined in a nested spatio-temporal context.

An integral perspective of SDW that examines how indicators may be mapped geographically, portraying a variety of ways of examining human-environment relations, will benefit from building upon a methodology already developed with many of these principles in mind. The ‘Wellbeing Assessment’ (WA) methodology, as used in the Wellbeing of Nations report (Prescott-Allen, 2001) provides a useful foundation for this research.

Well-being Assessment (WA) Methodology

The WA method provides a basis to assess the sustainability and well being of both ecosystems (or the environment) and people (humans, including social and economic factors) (Figure 3). It does this through the use of a whole-part structure that sub-divides ecosystem and human system components into nested levels, from the whole system, to sub-systems (people and ecosystems), to dimensions and elements of each of those sub-systems.

There are six stages to the WA method that involve working around the framework in a cyclical manner (Figure 4), starting with defining the system and its goals and objectives, to the collection and analysis of indicators, to a complete assessment and review of all system components. Indicators are selected to represent system dimensions at the element level, and are aggregated upward using performance criteria established in relation to goals and objectives.

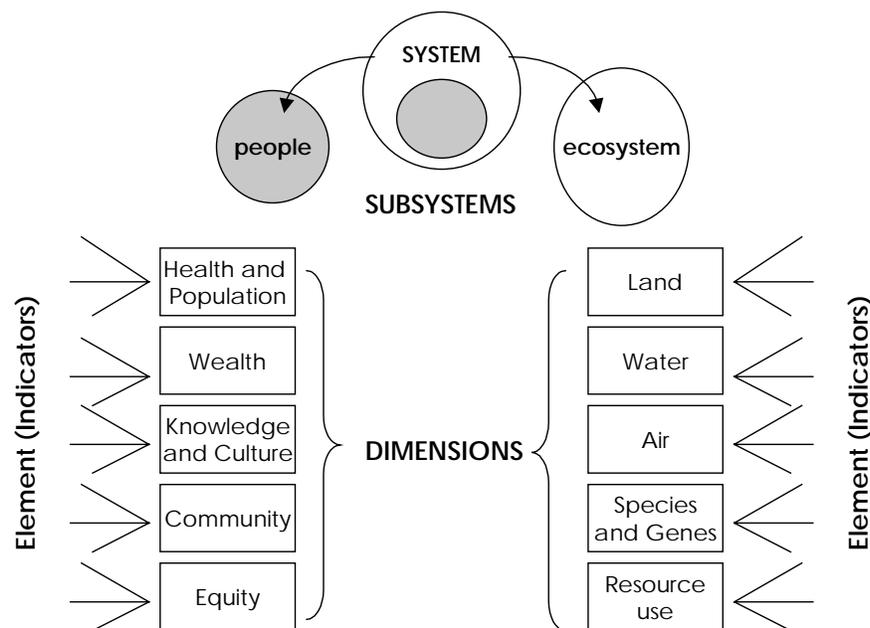


Figure 3. General framework of the Wellbeing Assessment (WA) methodology.

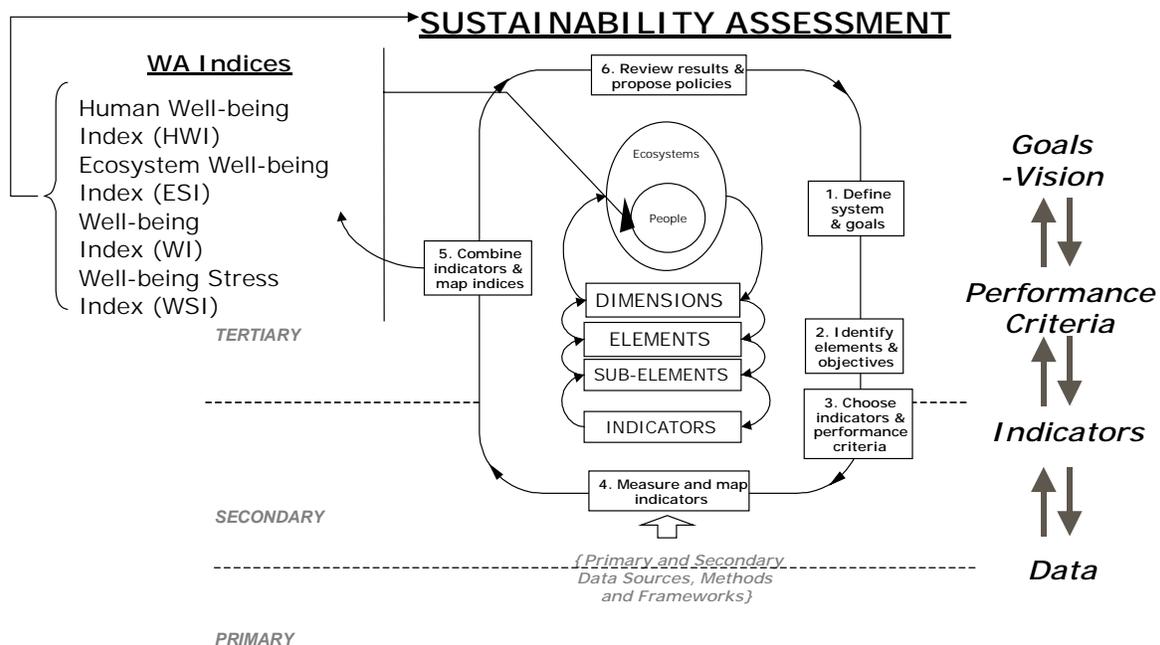


Figure 4. General overview of the structure and approach used in the Well-being Assessment (WA) methodology (modified after Prescott-Allen (2001), p. 279).

At the highest level in the framework, the WA method produces four main indices that provide a basis from which SDW be assessed (either as a whole, or for specific sub-components the system). They include:

- ◆ Human Well-being Index (HWI),
- ◆ Ecosystem Well-being Index (EWI),
- ◆ Well-being Stress Index (WSI) and
- ◆ Well-being Index (WI).

Indicators are derived through the assignment of performance criteria to various selections of data that represent the elements or sub-elements of the dimensions, and are aggregated upward to produce the four indices. All indicators and indices are mapped on to a 0-100 score scale, and are plotted on a ‘barometer of sustainability’ (BoS) graph (Figure 5). Final assessments show scores for the total system as represented by the intersection of ecosystem (EWI) and human system (HWI) scores, which can be sub-divided into their respective dimension scores. A normalized ratio of the EWI and HWI scores provides the basis for the WSI to indicate the relative degree of stress humans are placing on the environment. The WI is the intersection between the HWI and EWI on the barometer. It is not represented by a single number, but must be read and interpreted through the combination of scores.

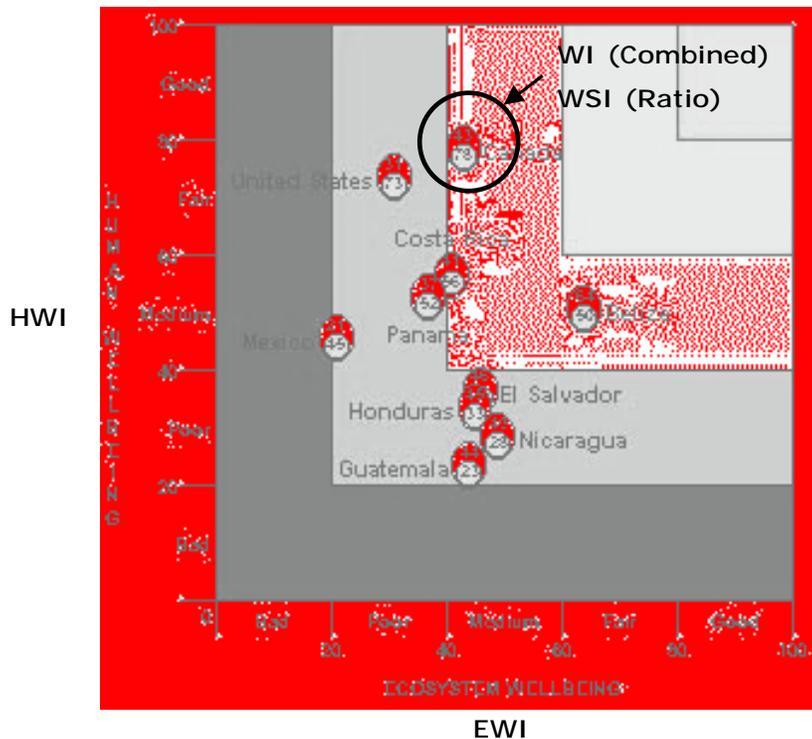


Figure 5. Example ‘Barometer of Sustainability’ graph showing the positions of a select number of countries assessed in the ‘Well-being of Nations’ (Prescott-Allen, 2001). Note: the barometer is usually colour coded; a grey-scale version is shown here.

One of the central features of the WA method is its use of ‘maps and narratives’ as primary information types in the delivery of assessment level reporting (e.g. see examples in Attachment D). The benefit of this approach is that the information is more easily readable by diverse audiences, while maintaining transparency. Narratives are used to explain the significance of results, as well as clarify assumptions and limitations. The WA method offers a convenient and consistent means for presenting and maintaining a track record of on-going assessments, data tables and maps, and other various technical and scientific texts that are not easily digested by many stakeholders or the public.

Some of the positive features of the WA method are summarized as follows:

- ◆ It is equitable to humans and environment.
- ◆ Other SD frameworks may be nested within the WA framework by situating them in their appropriate sub-systems and dimensions.
- ◆ Indicators are normalized on a qualitative scale set in relation to specific goals and objectives for system dimensions and elements (and are not bound by monetary or physical units).

- ◆ It requires indicators to be mapped to geographical-based administration units. This allows sustainability to be assessed on a locational basis.
- ◆ It is an open-concept framework in that system components and indicators can be defined by the stakeholders upon implementation.
- ◆ It presents indicator and related information in a format that is visually appealing, intuitive, and transparent, thereby increasing the communication power to a wide audience without losing scientific rigour.
- ◆ It supports many of the Bellagio Principles for the use of SD information (IISD, 1997) (See Attachment B).

Research Questions

The WA method provides a basis to examine a number of pertinent questions in relation to geography, cybercartography, indicator mapping and an integral perspective on SDW.

- ◆ From a critical perspective, we may ask to what extent do such maps present ‘messages’ about different regions? Is it possible to examine uncertainties or alternatives in the performance criteria used? And what impact might this have on the visualization of results? Can a different performance scale be used in place of the ‘good-bad’ value system (i.e. such as ‘IS’ vs. ‘IS NOT’ sustainable)?
- ◆ Within the cybercartographic field, classical cartographic questions to ask include the choice of projection, colour, and intervals chosen on the barometer scale. Altering these elements will change the message of the map. What would be the affect of the message of the map to different ways of visualizing the results of an assessment? The cybercartography paradigm also considers the possibility for maps to be ‘multi-authored’. Is this possible with WA maps? What would be required to achieve this?
- ◆ From a geographical information processing perspective, we may ask whether different ‘containers’ (boundaries) can be used such as ecosystem boundaries, or alternative human-environment mapping frameworks. Can the primary or secondary data be re-processed in such a way to allow alternative frameworks to be used? If so, what would be the affect on visualization and the messages the maps send to the reader? Would they tell the same story or result in the same policy options?
- ◆ How would the WA method be applied at ‘sub-global’ levels, such as for a continent, an individual nation, a region or a community? Is it possible to reference a comprehensive WA assessment for a geographic region that is only a ‘part’ of the whole? How do we determine the boundaries of a region in relation to its supraordinate and subordinated levels? Can the same indicators and performance criteria be applied or related at multiple scales?

- ◆ Additionally, what might this approach tell us about human understanding of SDW in general? Will it tell us something we do not already know? Can it provide a critical basis from which we can question our assumptions about regions or the geography of the world in general? Are there limits or uncertainties to be dealt with, and what do we do in situations where an assessment reveals numerous information gaps or uncertainties?

Research Framework

Addressing the preceding range of questions (as opposed to a specific few) epitomizes the research challenge surrounding SDW within the field of geography and environmental studies. The research framework proposed here approaches this problem by differentiating these questions into ‘what’ can be said of the world, and ‘how’ it is said or communicated. This approach is developed in the concepts of ‘Integral Geography’ and ‘Cybercartography’ (Eddy, 2004, forthcoming). Intrinsic to this theoretical framework is an integral perspective on the role of science and epistemology in the field set in relation to ‘knowing’ and ‘being’ (Eddy, 2003). The latter provides an envelope within which former theoretical and applied elements can be situated; an overarching framework that situates a ‘formal’ theoretical framework within a ‘post-formal’ critical context (Figure 6).

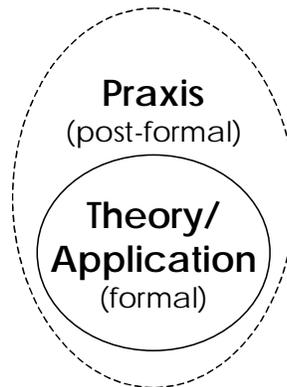


Figure 6. Graphical illustration of a holonic relation among theory and application as formalism nested within a post-formal ‘praxis’.

This general approach will influence the overall structure and contents of the thesis in three sections: 1) Theory, 2) Application, and 3) Praxis. Research planned for each of these sections is summarized as follows:

Part 1 – Theory.

This section will examine an Integral perspective on SDW. The importance of ‘place’ within this perspective will be elaborated through the use of Integral Geography and Cybercartography, and will be introduced in the context of their application to a theoretically ‘enhanced’ WA

methodology. The enhanced WA methodology will be used as a framework to test its application using existing data.

There is a growing amount of research being conducted on integral sustainability (Attachment C). It will benefit this approach by reviewing this material, and incorporating it where possible in the integral perspective to be developed in this section. This integral theoretical perspective will consider the following elements:

- ◆ Sustainability and development as intrinsic to the AQAL framework, and how the AQAL framework helps to reveal their inherent relations
- ◆ How the AQAL matrix can be used to examine a ‘pressure-state-response’ approach for SDW assessment and policy formulation
- ◆ Elaborate the importance of ‘deep structures’ and ‘surface structures’, their nested holarchical characteristics and dependencies, and the many systems available for studying them
- ◆ How the past exerts pressures on the present, and how in the present, creative novelty can operate to correct for past inheritances, and how some need to be accepted
- ◆ How the present will affect the future generations and the importance for taking history, heritage, and institutional change into account
- ◆ Highlight important distinctions between ‘potentiality’ and ‘actuality’ in terms of ‘people, place and perspective’, and implications for performance criteria selection
- ◆ Differentiate notions of ‘sustainable development’ and ‘attainable development’ in relation to place
- ◆ How the A-B-C/1-2-3 approach outlined in Integral Geography can be used as mainstream communication template for examining SDW (the ‘what can be said’ part)
- ◆ Examine integral perspectives on communication in relation to SDW issues
- ◆ How the seven elements of cybercartography provide a framework for information processing, mapping, and communication of SDW indicators and related information
- ◆ How the holonic tenets and the A-B-C/1-2-3 approach can be used to outline an enhanced WA framework, and theoretical guidelines for praxis

Part 2 – Application.

The objective of this applied section is to specifically explore and uncover cybercartographic issues that are involved on both global and sub-global levels of application of WA analysis and

mapping. The elements of cybercartography (Taylor, 2003, Eddy, et. al., 2003) extend those of classical cartography in a number of ways. It is helpful to think of it as a shift from the 'singular' to the 'plural'. Maps produced during the modern era were commonly produced on one medium (usually paper), by one author or organization, had only one static form of visualization, and usually served a limited audience.

Cybercartography examines how many of these elements are pluralized. That is, what if we were to ask questions around the WA method, and the WoN data specifically:

- ◆ Can there be multiple cartographic representations of the data?
- ◆ What issues arise in cases where these maps are multi-authored?
- ◆ How would such a method be applied at multiple scales?
- ◆ How could such maps or applications be made 'interactive' for a wide-range of users? (i.e. can users choose how to assign performance criteria, or visualize the results in different ways?)
- ◆ What about the possibility for a multi-media application that can use these types of maps as meta-references for a plethora of SDW information about the world?
- ◆ What issues would arise if the WA method was implemented as part of an on-line information system, supporting an on-going assessment program (essentially a decision-support system)? What are the organizational and technological constraints?
- ◆ What kind of institutional arrangements and partnerships would be necessary for implementation across scales?

This applied part of the thesis will explore these questions in two sections:

- 1) Using the existing data in the Wellbeing of Nations report on the global level, and
- 2) Using existing Canadian and North American data sources to explore issues of 'scale' from the global to the local.

Cybercartographic issues involved in examining different ways of looking at the same data will be explored on the global level. This will include:

- ◆ The use of alternative frameworks to the current nation-state/political boundary framework used in the WoN report, including ecological frameworks, and a generalized 'land-use/land-cover' framework for mapping human and ecological variables simultaneously.
- ◆ Exploring alternative assessment scales, class intervals and colour schemas against the alternative frameworks.

Part 3 – Praxis.

There are two findings expected from the theory and application sections of this work that highlight the important distinctions between the dichotomy of theory and application to that of ‘praxis’, especially in relation to SDW and indicator support:

- 1) Theoretical constructs and their applied elements are mutually reinforcing. Good theory is informed not only by empirical evidence, but also by its pragmatic application. This will provide a basis to further differentiate important distinctions between idealistic and realistic aspects of SDW, its potential relation to discourse on SDW, and its affects on policy-society relations.
- 2) Even within holistic paradigms such as SDW, the WA method, as well as Integral Theory itself, there can only ever be ‘partial perspectives’ that limit the human ability to make universal statements about the ‘state of the world’, or even ‘well-being’ in any formalist sense. Addressing these limitations may present one of the most significant challenges for SDW. That is, how to deal not only with what we know, but also with what we do not know or cannot know.

It is from these expected findings that questions of ‘knowing’ and ‘being’ will be examined from a post-formal, vision-logic perspective. The presupposed formal relation among sustainability, development and well being will be questioned in terms of what ‘wellness’ means, and what ‘being’ means in relation to information and knowledge about ourselves and the world.

Two quotations provided by Wilber on this theme will be explored more fully:

“Every neurosis is an ecological crisis” (Wilber, 1996. p. 169)

“The startling fact is that ecological wisdom does not consist in how to live in accord with nature; it consists in how to get subjects to agree on how to live in accord with nature. This wisdom is an intersubjective accord in the noosphere, not an immersion in the biosphere. No representation of the biosphere whatsoever will produce this wisdom.” (Wilber, 1995, p. 293) (My underline)

What may be revealed is that in the cybercartography paradigm, the use of maps and visualization will not necessarily follow the modernist path of colonial influence, but rather, maps and mapping can also be used as a basis to highlight the many ways the world may be examined from multiple perspectives; to explore both what we can know, and what we cannot know. What may constitute authentic or legitimate knowledge about the world may represent more about what is agreed upon among subjects involved in knowledge construction, rather than pointing to an ultimate truthful state of affairs about the world.

Workplan

The Gantt chart in Figure 7 provides an overview of the proposed workplan. The planned date for completion of the thesis is December 2005, which involves a general progression of activity towards the completion of the three parts outlined above. Research to be completed by December 2004 includes the literature review and preparation of the theoretical material for an integral perspective of SDW.

In parallel, research will begin this summer on the collection, exploration and modelling of the global and sub-global data. It is anticipated that this work will be completed by the summer 2005.

	2004			2005		
	W	S	F	W	S	F
Theory						
- On-going Lit. Review	-----			.. on-going		
- Integral Perspective			Paper*			
Application						
- Data Collection						
- Exploration / Modelling						
- Analysis / Synthesis						
- Map/App Preparation					Map / App*	
Praxis						
- Lit. Review				.. on-going		
- Narrative						
Synthesis						Complete
Dissertation						Complete

Figure 7. Workplan.

Expected Results

The expected results are set in relation to the proposed title of the thesis:

- 1) to uncover the cybercartographic issues in mapping SDW indicators, and
- 2) to situate these issues with an integral perspective on SDW.

It is understood that the aim is not to produce a meta-narrative or a state-of-the-world report. Given the broad theoretical material that will need to inform this work, and the potentially numerous data and indicator mapping issues, it is understood that there is a risk that such an endeavour may have a tendency to follow tangents. It will be important to keep this in mind to keep this research in scope, as well as a basis for evaluation and defence.

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Attachment A – The Twenty Holonic Tenets

1. Reality is composed, not of wholes or parts, but of holons (whole/parts).
2. Holons display 4 fundamental capacities:
 - (a) self-preservation (wholeness/agency)
 - (b) self-adaptation (partness/communion)
 - (c) self-transcendence
 - (d) self-dissolution
3. Holons emerge.
4. Holons emerge holarchically.
5. Each emergent holon transcends but includes its predecessors.
6. The lower sets the possibilities of the higher; the higher sets the probabilities of the lower.
7. The number of levels which a hierarchy comprises determines whether it is 'shallow' or 'deep'; and the number of holons on any given level we shall call its span.
8. Each successive level of evolution produces greater depth and less span.
9. Destroy any type of holon, and you will destroy all of the holons above it and none of the holons below it.
10. Holarchies co-evolve.
11. The micro is in relational exchange with the macro at all levels of its depth.
12. Evolution has directionality:
 - (a) Increasing complexity
 - (b) Increasing differentiation/integration
 - (c) Increasing organization/structuration
 - (d) Increasing relative autonomy
 - (e) Increasing telos

Attachment B – The Bellagio Principles of SD

1. GUIDING VISION AND GOALS

Assessment of progress toward sustainable development should:

- be guided by a clear vision of sustainable development and goals that define that vision.

2. HOLISTIC PERSPECTIVE

Assessment of progress toward sustainable development should:

- include review of the whole system as well as its parts
- consider the well-being of social, ecological, and economic sub-systems, their state as well as the direction and rate of change of that state, of their component parts, and the interaction between parts
- consider both positive and negative consequences of human activity, in a way that reflects the costs and benefits for human and ecological systems, in monetary and non-monetary terms

3. ESSENTIAL ELEMENTS

Assessment of progress toward sustainable development should:

- consider equity and disparity within the current population and between present and future generations, dealing with such concerns as resource use, over-consumption and poverty, human rights, and access to services, as appropriate
- consider the ecological conditions on which life depends
- consider economic development and other, non-market activities that contribute to human/social well-being

4. ADEQUATE SCOPE

Assessment of progress toward sustainable development should:

- adopt a time horizon long enough to capture both human and ecosystem time scales thus responding to needs of future generations as well as those current to short term decision-making
- define the space of study large enough to include not only local but also long distance impacts on people and ecosystems
- build on historic and current conditions to anticipate future conditions where we want to go, where we could go

5. PRACTICAL FOCUS

Assessment of progress toward sustainable development should be based on:

- an explicit set of categories or an organizing framework that links vision and goals to indicators and assessment criteria
- a limited number of key issues for analysis
- a limited number of indicators or indicator combinations to provide a clearer signal of progress
- standardizing measurement wherever possible to permit comparison
- comparing indicator values to targets, reference values, ranges, thresholds, or direction of trends, as appropriate

5. OPENNESS

Assessment of progress toward sustainable development should:

- make the methods and data that are used accessible to all
- make explicit all judgments, assumptions, and uncertainties in data and interpretations

6. EFFECTIVE COMMUNICATION

Assessment of progress toward sustainable development should:

- be designed to address the needs of the audience and set of users
- draw from indicators and other tools that are stimulating and serve to engage decision-makers
- aim, from the outset, for simplicity in structure and use of clear and plain language

7. BROAD PARTICIPATION

Assessment of progress toward sustainable development should:

- obtain broad representation of key grass-roots, professional, technical and social groups, including youth, women, and indigenous people to ensure recognition of diverse and changing values
- ensure the participation of decision-makers to secure a firm link to adopted policies and resulting action

8. ONGOING ASSESSMENT

Assessment of progress toward sustainable development should:

- develop a capacity for repeated measurement to determine trends
- be iterative, adaptive, and responsive to change and uncertainty because systems are complex and change frequently

- adjust goals, frameworks, and indicators as new insights are gained
- promote development of collective learning and feedback to decision-making

9. INSTITUTIONAL CAPACITY

Continuity of assessing progress toward sustainable development should be assured by:

- clearly assigning responsibility and providing ongoing support in the decision-making process
- providing institutional capacity for data collection, maintenance, and documentation
- supporting development of local assessment capacity

Attachment C – Index of Selected Collaborative Research on Integral Sustainability

INTRODUCTORY

Brown, Barrett; *Simple overview of history of sustainability and quadrants*, 10-20 pages. (Done by May 30)

Brown, Barrett; *Theory and Praxis of Integral Development: An Introduction* (52 pages)

Brown, Barrett; *Seven Ways One Person Can Change The World*, Reprint from *Spirituality and Reality* (UN Journal), Spring 2003

Merry, Peter; *Do We Need Nature?* Shell-Economist essay

INTERMEDIATE

Beck, Don; *Sustainable Cultures, Sustainable Planet: A Values System Perspective on Constructive Dialogue and Cooperative Action*

Beck, Don; *Stages of Social Development: The Cultural Dynamics that Spark Violence, Spread Prosperity, and Shape Globalization and The Twelve Postulates: An Integral Perspective on Globalization*

Brown, Barrett; Perera, Nomali; Giselle, Jon; *Examples of Real Communications about Environmental Issues to and from Different Worldviews*

Brown, Barrett; *Integral Sustainability: An AQAL Overview*

Riedy, Chris; *A Deeper and Wider Understanding of Sustainable Development*

ADVANCED

Hargens, Sean; *Integral Ecology: The What, Who and How of Environmental Phenomena* (53 pages)

Hargens, Sean; *Integral Development: Taking The Middle path Towards Gross National Happiness (Bhutan Case Study)* (40 pages)

Hamilton, Marilyn; *Discovering Integral Capacities in the Global Village Through Values Meta-Mapping*; (46 pages)

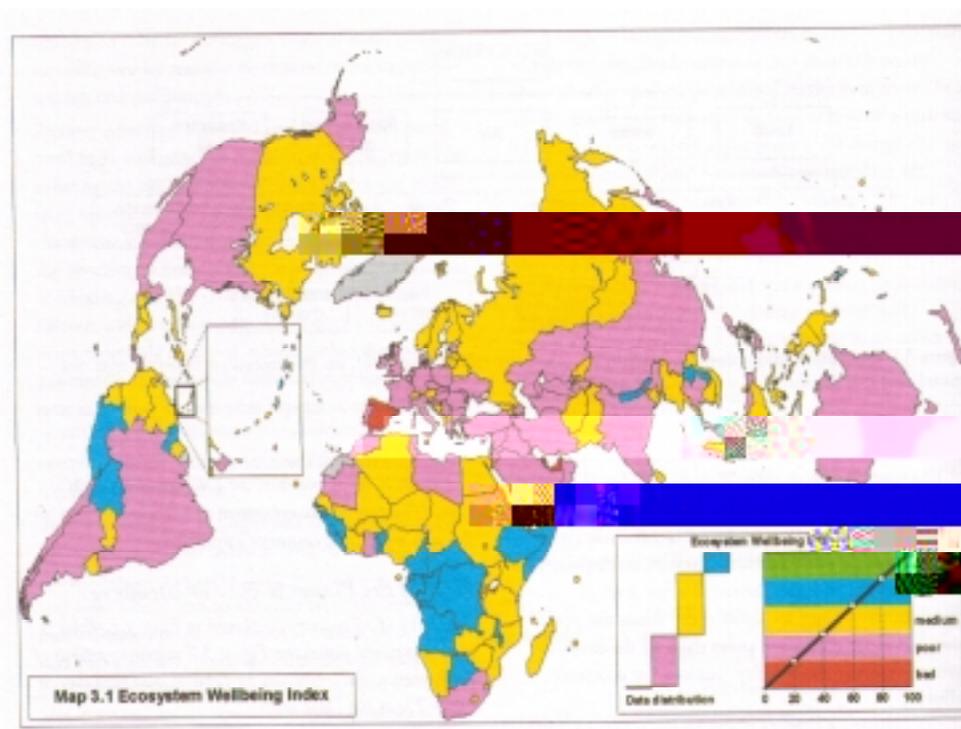
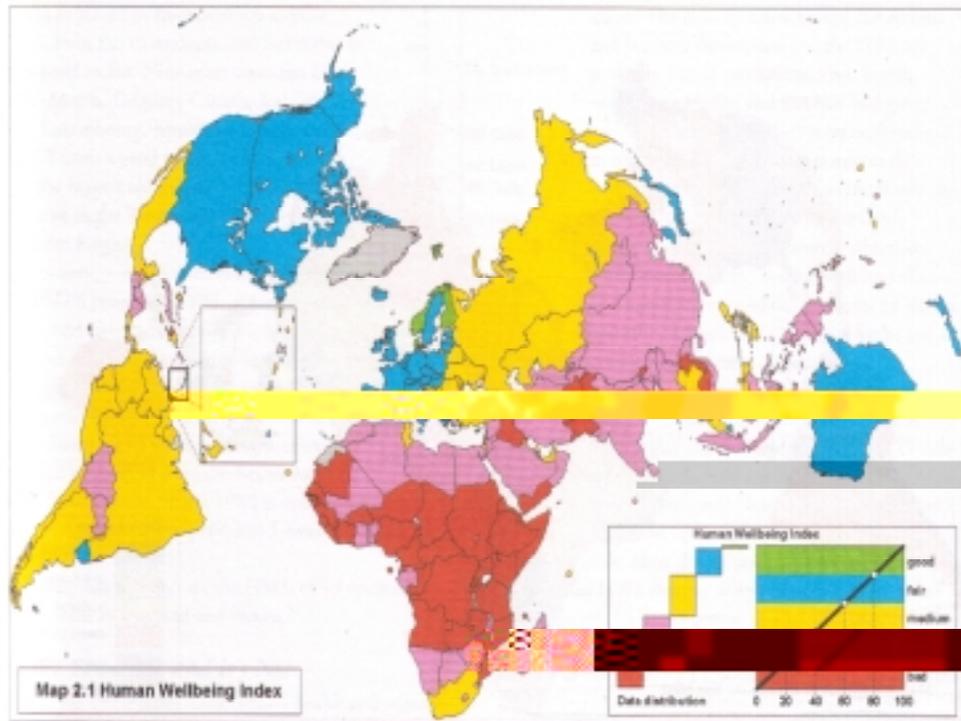
Lazlo, Alexander; *Evolutionary Systems Design: A Praxis for Sustainable Development* (18 pages)

Leonard, Adam; *Talking with the Spiral: Communicating Sustainability*

McEwen, Cynthia; *Application: Integrally Informed Communication on Sustainability* (Master's Degree project and thesis; outline available now, thesis completed in mid-March)

Quilligan, James; *A redefinition of economic sustainability through the AQAL perspective, providing a comparative analysis of Integral Sustainability and the Brandt Reports (North-South and Common Crisis, the reports of Willy Brandt's Independent Commission on International Development Issues)* (Finished Summer, 2004)

Attachment D – Example WA Maps



[Note: both maps scanned from WoN Report (Prescott-Allen, 2001)]